National Imagery and Mapping Agency

Submission of Proposals

NIMA's (National Imagery and Mapping Agency) mission is to provide timely, relevant, and accurate imagery, imagery intelligence, and geospatial information in support of national security objectives. Therefore NIMA pursues research which will help it guarantee an information edge over its potential adversaries. This is NIMA's first solicitation through the Small Business Innovation Research (SBIR) Program. Potential proposers unfamiliar with NIMA can find background information on NIMA's homepage at http://www.nima.mil.

NIMA has identified four technical topics, numbered NIMA 98-001 through NIMA 98-004, which prospective small businesses may respond to in the second fiscal year 98 solicitation (FY 98.2). Topics of current interest to NIMA are described on the following pages. All of the topics are unclassified. Please note that NIMA will only accept unclassified proposals on topics from this list.

Proposers must mail or hand-carry three copies of each proposal to the following NIMA Point of Contact.

Ms. Carol Uhlfelder
4600 Sangamore Rd.
Mail-Stop D-88
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Proposers are encouraged, but not required, to also submit the proposal on a Zip **J** disk in HTML 3.2 with the root file called "index.htm". All other proposal files, if any, on the disk must be accessible through hyperlinks from the "index.htm" file.

Proposal submission questions should be directed to Ms. Carol Uhlfelder. All other questions should be directed to

Dr. Young Suk Sull
Mail-Stop: P-53
12301 Sunrise Valley Drive
Reston, VA 20191-3449
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E-mail: sully@nima.mil

Each NIMA Phase 1 contract will have a base period of performance of six months with an option of an additional three months. The price of each proposal will not exceed a total of $100,000, with $70,000 allotted to the base proposal and $30,000 to the option. The option will be included with the base proposal at the time of submission. The base proposal plus option will not exceed the 25 pages limit. Exercise of the option will be at the sole discretion of NIMA.

NATIONAL IMAGERY AND MAPPING AGENCY
SBIR 98.2 TOPIC DESCRIPTIONS

NIMA 98-001 TOPIC: Imagery Exploitation Applications of Neuroscience

KEY TECHNOLOGY AREAS: Human Systems Interface, Battle Space Environments

OBJECTIVE: Explore and develop NIMA applications of Neuroscience to imagery and geospatial analysis for eventual deployment as tools in open system environments.

DESCRIPTION: Neuroscience has recently shown great advances in knowledge of how biological systems work. Some of this knowledge pertains to how the brain works, how it classifies and attains cognition, and how complexity in the brain arises that leads to intelligence. Although still in its infancy, it is already suggesting new approaches to developing artificial systems for recognition and cognition that can be applied to Intelligence and Geospatial communities' analysis and exploitation problems.

PHASE I: Identify, develop, and assess neuroscience technologies as applied to imagery exploitation.

PHASE II: Implement the technologies into NIMA and military exploitation systems.

PHASE III DUAL USE APPLICATIONS: In addition to the above military applications, medical personnel, who exploit imagery such as X-rays, Ultra-sound, and tomography during patient diagnosis, can use these technologies. Industrial applications include those of image understanding, in areas such as robot control and quality assurance.

NIMA 98-002 TOPIC: Deriving Geospatial Information from Electronic Signals

KEY TECHNOLOGY AREAS: Battle Space Environments, Sensors

OBJECTIVE: The objective is to develop techniques and strategies for generating land and water feature data from electronic signals for the generation of maps and charts.

DESCRIPTION: The current process for generating feature data is heavily dependent on aerial and satellite imagery as source data. The use of electronic signals or Signals Intelligence (SIGINT) could allow for the autonomous generation of large geospatial feature data sets. This includes feature attribution, description information about the feature. Traditionally, SIGINT has been used for intelligence only; this would be a new application of the technologies.

PHASE I: Identify matches between features and electronic signals and develop strategies for collecting and processing the data. This includes a quality assessment of the data.

PHASE II: Develop a prototype and demonstration of the technology. If demonstration evaluation is positive, the technology will be implemented in NIMA's production systems.

PHASE III DUAL USE APPLICATIONS: In addition to the above military applications, the technology could be used in demographic studies, and urban and regional planning.

NIMA 98-003 TOPIC: Terrain Data Integration

KEY TECHNOLOGY AREAS: Battle Space Environments

OBJECTIVE: To develop tools for nearly automated geospatial data fusion.

DESCRIPTION: Effort would investigate the development of robust, nearly automated, consistent, coherent methods and processes for integrating, editing and refining elevation, feature and imagery data into a uniform database. Currently all data integration is performed manually by expert users. Staffing and operation concepts are pushing the responsibility for data integration to the end user. This research would investigate the availability of processes and tools that could be aggregated into a General User Interface application that would enable a non-expert to perform the project. The package should include data samples and help information to educate the end user on the process.

PHASE I: Investigate and develop methods and processes for nearly automated geospatial data fusion.

PHASE II: Prototype and demonstrate the technology during a military exercise.

PHASE III DUAL USE APPLICATIONS: In addition to the military applications, the technology would support many internet applications where geospatial information was used.

NIMA 98-004 TOPIC: Use of A Priori Information in Determining Terrain Elevation

KEY TECHNOLOGY AREAS: Battle Space Environments

OBJECTIVE: To improve the speed and accuracy of generating terrain elevation data by using a priori information.

DESCRIPTION: Standard methods for generating terrain models do not consider pre-existing elevation information. However, when low-resolution terrain models already exists, e.g., Digital Terrain Elevation Data (DTED) level II and I, they may provide important information that can improve the accuracy and robustness of the recovered terrain model. The research should investigate methods for assimilating a priori 3D information, such as DTED or IFSAR range images (at any resolution) to initialize the computational process for improving both the efficiency and accuracy of the terrain modeling process. Because the computational search for a new terrain model may begin about an existing model, inconsistencies between the existing terrain model and images of the current terrain should be easily detected. Topographic changes in the new terrain model that fall outside expected accuracy should be quickly flagged.

PHASE I: Investigate and develop methods for improving terrain elevation determination by using a priori information.

PHASE II: Prototype and demonstrate the technology during a military exercise.

PHASE III DUAL USE APPLICATIONS: In addition to the military applications, the technology could be applied in civilian surveying.